

Construction Techniques Comparison

	(1) note	(2)	(3)	Example
1	high quality material	continuous structure	non arch	General technique for pillar, beam, crossbeam, floor.
2	high quality material	continuous structure	arch	General technique for RC arch
3	high quality material	discrete structure	non arch	General technique for heaping stones and blocks
4	high quality material	discrete structure	arch	Traditional stone arch is not recognized as general technique in terms of economy. Economy and endurance will be pursued by the technique according to the present invention
5	low quality material	continuous structure	non arch	Unstable (not usable)
6	low quality material	continuous structure	arch	Used for the ceiling of a kiln for traditional charcoal making. Not recognized as a modern technique. Rational design and practice can be realized by the technique according to the present invention
7	low quality material	discrete structure	non arch	general technique for soil fort and mound
8	low quality material	discrete structure	arch	new technique

Fig. 1

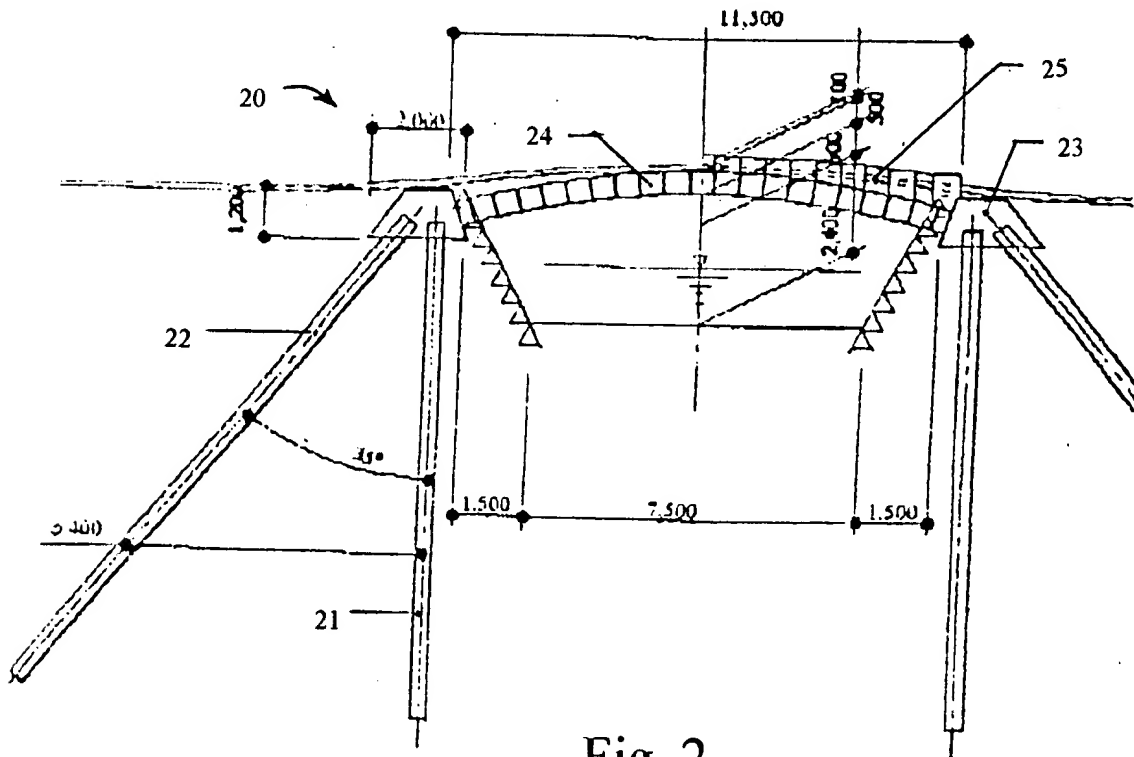


Fig. 2

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FIG. 3

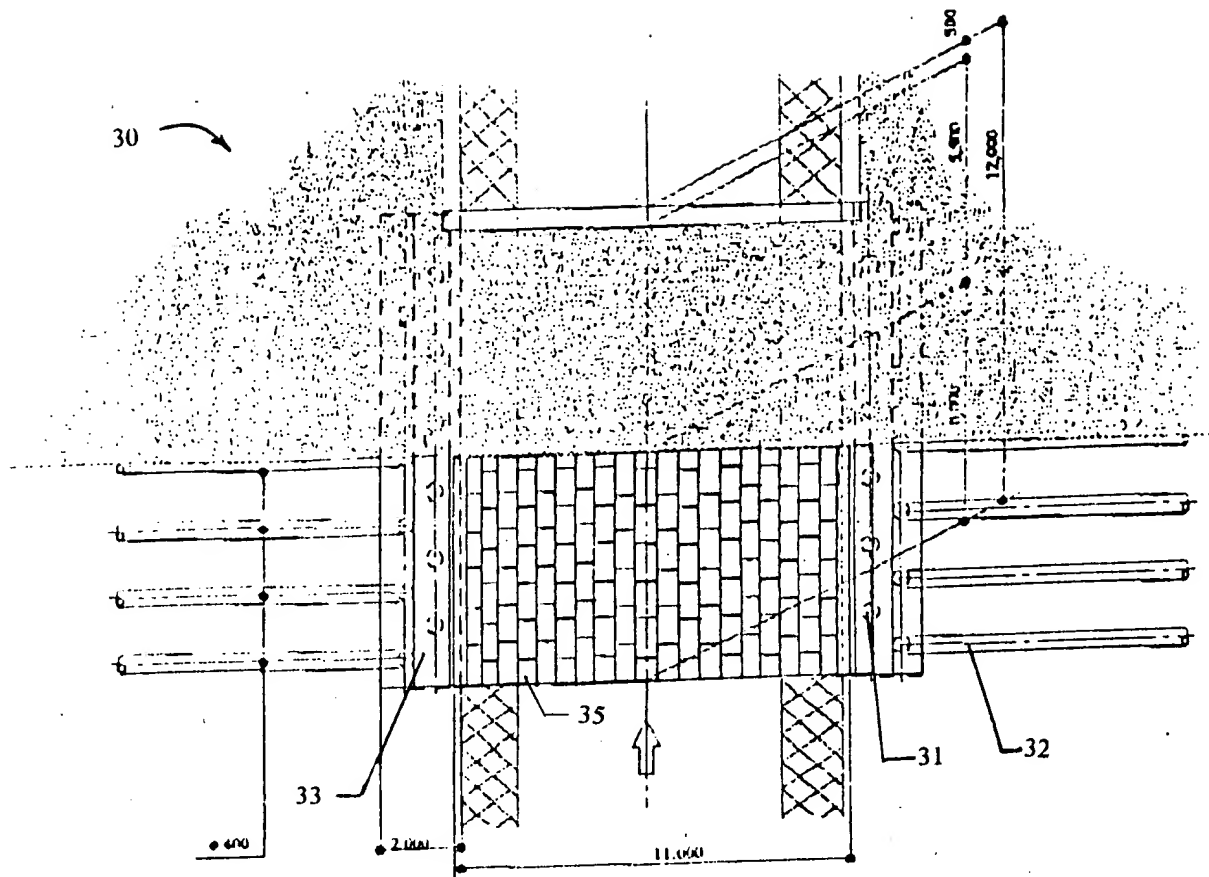


Fig. 3

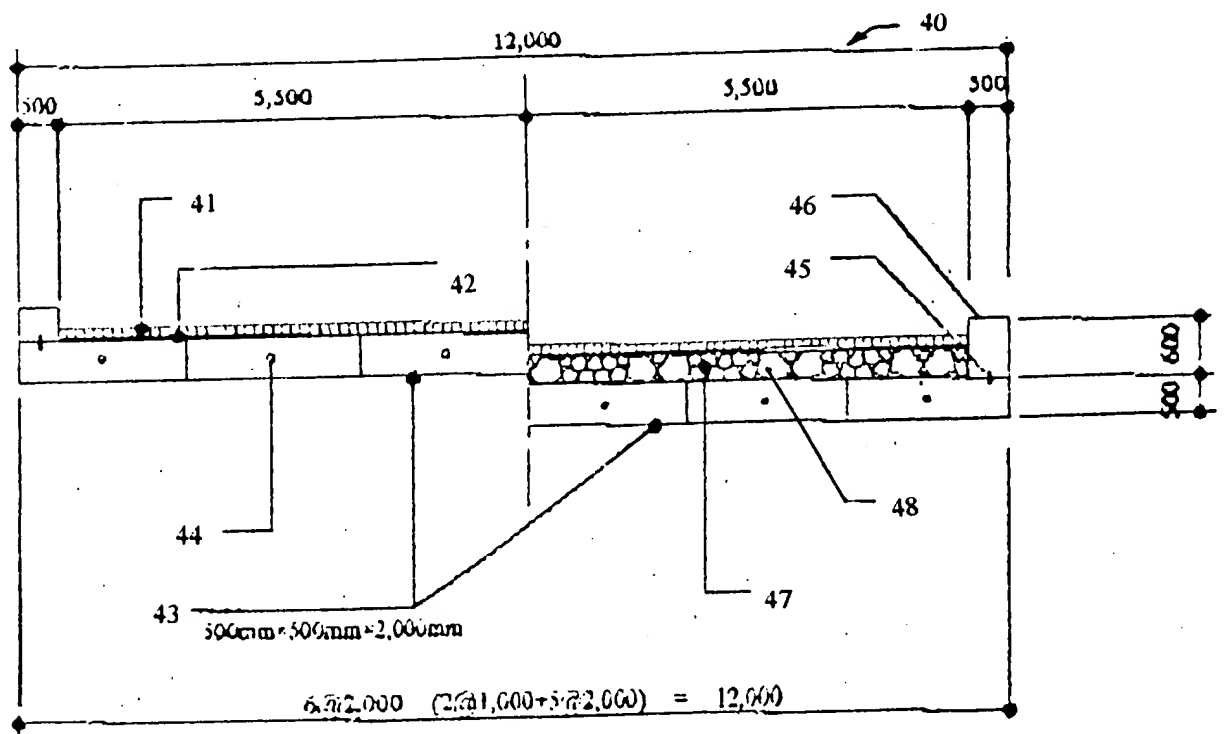


Fig. 4

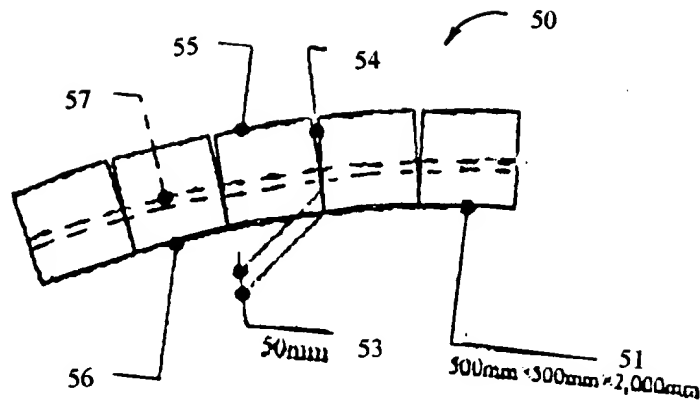


Fig. 5

Design condition

Bridge Type		Road bridge (A live load)
Bridge length		11,500m
Bridge width		12,000m (useful width 11,000m)
Style of upper part		constraint discrete material arch structure (stone arch)
Design model		Individual elements analysis (normally, at live load, on earthquake in the bridge axis direction) and 3-D shell model (on earthquake in the direction orthogonal to the bridge axis direction)
Style of lower part and foundation		Pit foundation ( oblique pit 35° )
Shake		Dynamic analysis
Material used	Arch	See the separate table.
	Prestress	To give the ability to restore separated meeting ends on abnormal load.
	Pavement	paving (curved stone paving)
	Pit	Pit $\phi$ 400

Fig. 6

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graph TD
    FM[Foundation material] --> BBM[Bridge base material  
(Pedestal member for prestress)]
    BBM --> SM[Supporting member]
    SM --> RSM[Remove supporting member]
    RSM --> PM[(Prestress material)]
    PM --> S[Scaffolding]
    S --> WS[Wall stone]
    WS --> F[Fill]
    F --> BS[Bridge surface]

    subgraph Arch_material [Arch material]
        subgraph Precast_block_process [Precast block process]
            ABP[Arch block preparation] --> CAS[Coarse arch stone]
            CAS --> FMET[Fill meeting ends with concrete]
        end
        subgraph Prepacked_block_process [Prepacked block process]
            AF[Arch framework] --> FCA[Fill coarse aggregate]
            FCA --> FC[Fill concrete]
        end
        FMET --> C[Cure]
        FC --> C
        C --> PM
    end
    SM --> ABP
    RSM --> C
  
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The flowchart illustrates the construction process for a bridge arch, starting with 'Foundation material' leading to 'Bridge base material (Pedestal member for prestress)'. This leads to the 'Supporting member'. The 'Supporting member' then leads to 'Remove supporting member', which leads to '(Prestress material)'. The '(Prestress material)' leads to 'Scaffolding', which leads to 'Wall stone', which leads to 'Fill', which leads to 'Bridge surface'. The 'Supporting member' also leads to 'Arch material', which is a large dashed box containing two sub-processes: 'Precast block process' and 'Prepacked block process'. The 'Precast block process' includes 'Arch block preparation', 'Coarse arch stone', and 'Fill meeting ends with concrete'. The 'Prepacked block process' includes 'Arch framework', 'Fill coarse aggregate', and 'Fill concrete'. Both processes lead to 'Cure', which leads to '(Prestress material)'. The 'Supporting member' also leads to 'Arch block preparation'.

Fig. 7

A diagram of a curved structure, possibly a pipe or duct, composed of several segments. The segments are labeled 80, 81, 82, 83, 84, and 85. Segment 80 is the leftmost segment, indicated by an arrow. Segment 81 is the segment immediately to the right of 80. Segment 82 is the segment immediately to the right of 81. Segment 83 is the segment immediately to the right of 82. Segment 84 is the segment immediately to the right of 83. Segment 85 is the segment immediately to the right of 84. The segments are connected by joints, and the entire structure is curved upwards.

Fig. 9